CHAPTER 19

p 586 to p 629 and supplementary work from in class notes and handouts

Study Guide

Key Concepts

19.1 Acid-Base Theories

- Acids taste sour, bases taste bitter and feel slippery. Both are electrolytes and cause indicators to change colors.
- In an aqueous solution, an Arrhenius acid yields hydrogen ions and an Arrhenius base yields hydroxide ions.
- A Brønsted-Lowry acid is a hydrogen-ion donor; a Brønsted-Lowry base is a hydrogen-ion acceptor.
- A Lewis acid is an electron-pair acceptor; a Lewis base is an electron-pair donor.

19.2 Hydrogen Ions and Acidity

- For an aqueous solution, the product of $[H^+]$ and $[OH^-]$ equals 1×10^{-14}.
- On the pH scale, 0 is strongly acidic, 7 is neutral, and 14 is strongly basic.
- The acid and base form of an indicator have different colors in solution.

19.3 Strengths of Acids and Bases

- The stronger an acid is, the larger its K_a value.
- To find K_a of a weak acid or K_b of a weak base, substitute the concentrations of the substances into the equilibrium expression.

19.4 Neutralization Reactions

- An acid and a base react to produce a salt and water.
- The point of neutralization is the endpoint of a titration.

Titration curves-calculations considering curve info.
Identifying features from a curve
Handouts supplementing the chapter
Five step Problems-predicting acid/base reactions.
Using an acid base table
ICE tables-for calculating Ka

19.5 Salts in Solution

- Salts that produce acidic solutions contain positive ions that release protons to water; salts that produce basic solutions have negative ions that attract protons from water.
- A buffer is a solution of a weak acid or weak base and one of its salts.

Vocabulary

- acid dissociation constant (K_a) (p. 607)
- acidic solution (p. 595)
- alkaline solution (p. 595)
- amphoteric (p. 592)
- base dissociation constant (K_b) (p. 608)
- basic solution (p. 595)
- buffers (p. 620)
- buffer capacity (p. 621)
- conjugate acid (p. 591)
- conjugate acid-base pair (p. 591)
- conjugate base (p. 591)
- diprotic acid (p. 588)
- end point (p. 615)
- equivalence point (p. 613)
- hydronium ion (H_3O^+) (p. 591)
- ion-product constant for water (K_w) (p. 595)
- Lewis acid (p. 592)
- Lewis base (p. 592)
- monoprotic acids (p. 588)
- neutral solution (p. 595)
- neutralization reaction (p. 612)
- pH (p. 596)
- salt hydrolysis (p. 619)
- self-ionization (p. 594)
- standard solution (p. 615)
- strong acid (p. 605)
- strong base (p. 608)
- titration (p. 615)
- triprotic acid (p. 588)
- weak acid (p. 605)
- weak base (p. 608)

Key Equations

- $K_w = [H^+] \times [OH^-] = 1.0 \times 10^{-14}$
- $pH = -\log[H^+]$
- $pOH = -\log[OH^-]$
- $K_a = \frac{[H^+][A^-]}{[HA]}$

$pH + pOH = 14$

$10^{-pH} = [H^+]$

$Kw = Ka \times Kb$

$10^{-pOH} = [OH]$

$Ka = \frac{[H^+]^2}{\text{conc of acid}}$

$Kb = \frac{[OH^-]^2}{\text{conc. of base}}$